



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,803	12/12/2003	Joseph Carmine Centanni	Centanni 2-32-9-22-5-7	3519
46363	7590	10/06/2006	(L)	
PATTERSON & SHERIDAN, LLP/ LUCENT TECHNOLOGIES, INC 595 SHREWSBURY AVENUE SHREWSBURY, NJ 07702			EXAMINER CURS, NATHAN M	
			ART UNIT	PAPER NUMBER
			2613	

DATE MAILED: 10/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/734,803

Applicant(s)

CENTANNI ET AL.

Examiner

Nathan Curs

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 8-21 is/are rejected.
- 7) ☒ Claim(s) 5-7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/03, 6/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 14, the specification supports converting an original single wavelength into multiple other single-wavelength replicas of the original single wavelength, but does not support converting a single wavelength into multi-band optical signals.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 9-13 and 15-21 rejected under 35 U.S.C. 102(b) as being anticipated by Ciaramella et al. ("Ciaramella") ("Fast tunable wavelength conversion for all-optical packet switching"; Ciaramella et al.; Photonics Technology Letters, IEEE; Volume 12, Issue 10, Oct. 2000, Pages: 1361-1363).

Regarding claim 1, Ciaramella discloses an optical switch, comprising: at least one optical combiner for combining at least two optical pump signals and an input data signal to produce a combined signal (fig. 2, elements Pump 1/2/3 and Signal); a non-linear optical element for imparting a second-order non-linear effect on the combined signal (fig. 2, element SOA and page 1362, col. 1, first full paragraph); and at least one optical splitter for separating the combined signal from said non-linear optical element into respective generated optical bands (page 1362, cols. 1-2, shared paragraph); wherein at least one of said at least two optical pump signals is controllably modulated such that a logic sequence of said input data signal is controllably switched (page 1361, col. 2, last paragraph through page 1362, col. 1, first full paragraph).

Regarding claim 2, Ciaramella discloses the optical switch of claim 1, further comprising at least two optical pump sources, each of said sources providing one of said at least two optical pump signals, wherein at least one of said at least two optical pump sources is adapted to controllably modulate its respective optical signal such that a logic sequence of said input data signal is controllably switched and an output signal of said optical switch comprises a multi-band switched optical signal (page 1361, col. 2, last paragraph through page 1362, col. 1, first full paragraph).

Regarding claim 3, Ciaramella discloses the optical switch of claim 1, wherein the frequency of said input data signal is substantially equal to the average of the frequencies of said at least two optical pump sources (fig. 3).

Regarding claim 4, Ciaramella discloses the optical switch of claim 2, further comprising a controller for controlling the modulation of the at least one modulated optical pump source (fig. 2, element Square Wave Generator).

Regarding claim 9, Ciaramella discloses the optical switch of claim 1, wherein said non-linear optical element generates a parametric amplification of the combined signals (fig. 2, element SOA and page 1361, cols. 1 and 2, shared paragraph).

Regarding claim 10, Ciaramella discloses the optical switch of claim 9, wherein said second-order non-linear effect comprises difference frequency generation (page 1361, cols. 1 and 2, shared paragraph).

Regarding claim 11, Ciaramella discloses the optical switch of claim 9, wherein an output of said optical switch comprises a replica of said input data signal and at least three idler signals (page 1361, col. 2, last paragraph through page 1362, col. 2, first partial paragraph).

Regarding claim 12, Ciaramella discloses the optical switch of claim 11, wherein said at least three idler signals comprise at least two mirrored idler signals and at least one translated idler signal (figs. 1 and 3).

Regarding claim 13, Ciaramella discloses the optical switch of claim 12, wherein said mirrored idler signals comprise input data signal conjugates (figs. 1 and 3).

Regarding claim 15, Ciaramella discloses the optical switch of claim 2, wherein said optical pump sources comprise laser sources (page 1362, col. 1, first full paragraph).

Regarding claim 16, Ciaramella discloses the optical switch of claim 1, wherein said at least one optical combiner comprises a band splitter (page 1362, cols. 1 and 2, shared paragraph).

Regarding claim 17, Ciaramella discloses the optical switch of claim 1, wherein said at least one optical splitter comprises a band splitter (page 1362, cols. 1 and 2, shared paragraph).

Regarding claim 18, Ciaramella discloses a method of optical switching using a fiber parametric device having at least two optical pump sources, comprising: combining a signal from each of said at least two optical pump sources and an input data signal to produce a

Art Unit: 2613

combined signal (fig. 2, elements Pump 1/2/3 and Signal); imparting a second-order non-linear effect on the combined signal and controllably modulating at least one of said at least two optical pump sources such that a logic sequence of said input data signal is controllably switched (page 1361, col. 2, last paragraph through page 1362, col. 1, first full paragraph).

Regarding claim 19, Ciaramella discloses the method of claim 18, further comprising separating said combined signal into respective generated optical bands (page 1362, cols. 1 and 2, shared paragraph).

Regarding claim 20, Ciaramella discloses the method of claim 19, wherein said second-order non-linear effect generates a parametric amplification of said combined signal such that an output of said fiber parametric device comprises a multi-band switched optical signal (page 1361, col. 2, last paragraph through page 1362, col. 2, first partial paragraph).

Regarding claim 21, Ciaramella discloses the method of claim 20, wherein the output of said fiber parametric device comprises at least a replica of said input data signal and three distinct idler bands (figs. 1 and 3).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ciaramella ("Fast tunable wavelength conversion for all-optical packet switching"; Ciaramella et al.; Photonics

Technology Letters, IEEE; Volume 12, Issue 10, Oct. 2000, Pages: 1361-1363) in view of Dasyuva et al. ("Dasyuva") (US Patent Application Publication No. 2002/0118415).

Regarding claim 8, Ciaramella discloses the optical switch of claim 1, but does not disclose that said non-linear optical element comprises a highly non-linear fiber. Dasyuva discloses that non-linear wave-mixing converters can be SOAs or fiber-based (paragraph 0047). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a fiber-based non-linear converter in the system of Ciaramella, since a fiber-based converter would not require an integrated circuit manufacturing process.

#### ***Allowable Subject Matter***

7. Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for indicating allowable subject matter: Ciaramella was the closest prior art found to the applicant's claim invention, and while Ciaramella discloses the case of two modulated pumps, Ciaramella does not disclose the case of two pumps where one is modulated and the other is maintained constant.

#### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


- US Patent Application Publication No. 2002/0054404 – discloses optical logic operations using two-pump SOAs.

- US Patent No. 6876487 – discloses all-optical wavelength conversion using 2+ optical pumps corresponding to WDM wavelengths.

9. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://paired.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
JASON CHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600